Input paper: [[1]](#footnote-1) ENAV23-3.1.13

Input paper for the following Committee(s): check as appropriate Purpose of paper:

**□** ARM **□** ENG **□** PAP X Input

**X** ENAV **□** VTS **□** Information

Agenda item [[2]](#footnote-2) 3.1

Technical Domain / Task Number 2 …………………………………

Author(s) / Submitter(s) ExactEarth via IALA Secretariat

Recommendations related to IALA Guideline 1139

# Summary

The following information has been received by the IALA Secretariat from ExactEarth with respect to proposals related to IALA Guideline 1139 which are contained within the annex to this paper:

*The first two are related to the definition of the satellite ASM message structure. The current message is technically incorrect and needs to be corrected, but in addition we believe that reducing the length of a message can improve potential reception from satellite since there will be no coordination of slot use in a satellite footprint and single slot messages will reduce the likelihood of collision. With reduction in total throughput it was thought that it would be best to also include a non-coded message that can be used in low-traffic areas, like the middle of the ocean, where the additional coding gain isn’t needed and more data throughput would be valuable.*

*The third recommendation relates to having only one nominal power setting. There is already provision in the document for different power levels, so 1W should not be left in the document as nominal since the only reason it is there is for the oil tanker edge case, not a nominal case.*

*The fourth recommendation is to increase the minimum time between transmission for SAT-ASM messages. Due to the significantly higher channel loading from satellite, using the same minimum transmit interval of up to 50 transmissions per minute would significantly impair satellite reception and should be reduced to a level appropriate for satellite.*

*The final recommendation is based on discussions at the intersessional where a 15% slot allocation time for satellite usage was thrown around and this seems acceptable even if ideally we would want more.  The one change that I think would be beneficial for terrestrial would be to use 30% slot allocation for satellite on one channel and 0% on the other.  This would mean that there would never be outage time on one of the channels for terrestrial and satellite would still get the same number of slots and reduce the number of slots with terrestrial message overlap from two to one.*

## Related documents

IALA Guideline 1139

# Action requested of the Committee

The Committee is requested to:

1. Note the information provided by Exact Earth and take action as appropriate.

ANNEX 1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Comment Number | Change Log item # or source document | Annex/  Section | Section, Table, Figure | Type of change | Reason for change, or what you want to accomplish | Proposed change to IALA G‐1139 |
| exactEarth-1 |  | A 1.2.7 | Table 7 | Tech | The ASM-SAT description is technically incorrect. Additionally, the message is defined as a 3-slot message which does not make sense for a satellite message without knowledge of other transmitters in the satellite footprint. Additionally, in order to allow for the possibility of maximum throughput a non-coded message should be added for ASM-SAT as well. | Change message as defined below (unknown what link IDs are available) |
| exactEarth -2 |  | A 1.2.4.3 | Table 4 | Tech | The interleaver and puncturing parameters for the changes suggested in exactEarth-1 need to be presented in Table 4 | Changes to Table 4 are defined below |
| exactEarth -3 |  | B 2.9 | B 2.9 | Tech | There should only be one nominal transmit power. There is already provision to use other power levels, so no need to keep legacy of oil tankers 1W condition | Remove 1W from the nominal transmit power level and only keep 12.5W |
| exactEarth -4 |  | B 4.3 | B 4.3 | Tech | Have a minimum transmission interval defined for ASM-SAT transmission since ASM-SAT will have far less access to the channel than terrestrial and therefore different transmission intervals | State that minimum transmission interval for ASM-SAT should be 1 minute |
| exactEarth -5 |  | B 4 |  | Tech | Add a new section to define slots that are to be used exclusively for ASM-SAT in order to ensure short buffer on ASM-TER messages doesn’t affect the entire satellite system. | Recommend that slots 1 to 675 in each frame on either ASM1 or ASM2 are allocated for satellite use only. This leaves one channel untouched for terrestrial and allocates 15% of the total ASM capacity to satellite |

***Table 7 ‐ ASM Link Configuration ID parameters – Columns to add to Table 7***

|  |  |  |
| --- | --- | --- |
| **PL format #** | **ASM-Sat** | **ASM-Sat** |
| Link Config ID | New | New |
| Channel BW | 16 | 16 |
| Roll off filtering | 0,35 | 0,35 |
| Signal BW | 13,0 | 13,0 |
| Symbol Rate | 9,6 | 9,6 |
| Burst size | 1 | 1 |
| Guard Time | 6,35 | 6,35 |
| Burst duration | 20,31 | 20,31 |
| Symbols/burst | 195 | 195 |
| Ramp-up/down | 4/4 | 4/4 |
| Ramp-up/down | 0,41/0,41 | 0,41/0,41 |
| Syncword Size | 27 | 27 |
| Syncword  modul. | PI/4 QPSK ( 00/11 only) | PI/4 QPSK ( 00/11 only) |
| Link Config ID  symbols | 16 | 16 |
| Link Config ID  modul. | pi/4 QPSK | pi/4 QPSK |
| Net symbols/  burst | 144 | 144 |
| Channel bits | 288 | 288 |
| Padding/ flush  bits | 0 | 0 |
| FEC decoder  input symbols | 144 | 144 |
| FEC decoder  input bits | 288 | 288 |
| FEC output  bits | 216 | 288 |
| FEC output  bytes | 27 | 36 |
| Modul. | PI/4 QPSK | PI/4 QPSK |
| Bits / symbol | 2 | 2 |
| FEC rate | 3/4 | 1 |
| Es/N0 on  AWGN |  |  |
| C/(N0+I0)  threshold |  |  |
| Minimum CQI  value |  |  |

Table 4: Add this line where applicable

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Link Conf ID | Nominal Code Rate | Information n Length | k1/k2 | p1|p2|p3|p4|p5|p6|p7|p8 | Puncturing | Trail ID |
| New | 288 | 216 | 2|108 | 31|37|43|47|53|59|61|67 | 8 | 8 |

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-1)
2. Leave open if uncertain [↑](#footnote-ref-2)